

# INFLUENCE OF CARDING MACHINE PRODUCTIVITY ON YARN QUALITY

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## ABSTRACT

This article is devoted to determining the influence of carding machine performance on yarn quality. The effects of the speed of the receiving and the main reels and the wiring between the main drum and the flat cloth on the quality of the carding tape are also examined.

**Keywords:** carding machine, receiver drum, main drum, hatch, tape, rover, yarn, performance, quality.

## 1. INTRODUCTION

The modernization and diversification of the textile industry is essential for the expansion of the volume and variety of competitive finished goods produced and demanded in the external markets for more efficient and cost-effective production and processing of cotton raw.

In the light of the foregoing, in the republic of Uzbekistan, practical measures are consistently being taken to ensure the further development of the textile sector. Particular, in Uzbekistan textile industry is steadily improving.

The number of textile factories is increasing and they are equipped with the latest technologies and equipment of the leading textile companies.

All this helps to increase the competitiveness of the products produced in the country, not only in the domestic market but also in the world market.

But continuous, determined work is needed to firmly establish and maintain the quality and competitiveness of products. The quality of textiles produced depends to a large extent on the quality of the fabric from which it is made, and the quality of the fabric depends on the quality of the yarn and the technology of its manufacture.

The physical-mechanical properties of the yarn, such as uniformity, purity, strength, and strength, depend on the spinning system and the way the semifinished are prepared for spinning.

At textile enterprises of the Republic there are flow lines «kipa-tape». The machines of the splitting and cleaning department emit up to 70% weed impurities and fiber defects.

The remaining weed impurities are found both on the surface and inside the fibres that form the fibrous flow into the scavenging machines. Therefore, further efficient cleaning of the fibrous product is possible only when the scraps are separated into individual fibres, which is done on the scab machines.

The aim of this work is to study the possibility of improving the quality of the netting tape and the performance of cardosesetting machines and to determine their impact on the quality of the yarn.

As is known only from well-combed and evenly creased ribbons can a clean and smooth yarn be developed? The separation of the bundles of fibres and the removal of the sores and vice from the bundles depends largely on the intensity of the operation of the receiving drum and the shearing between the main drum and the hats.

## 2. DISCUSSION AND RESULTS

To solve this problem, we conducted experiments to determine the influence of the parameters of the carding machine on the quality of the carding tape.

These tests were carried out on the equipment of «Rieter» company installed at the enterprise "URGTEX". The production of knitted yarn with a linear density of 20 tex (Ne=30) used medium fibrous cotton of type I and type II breeding classes C-6524 «good» of the class. The properties of cotton fibre and semi-finished products were determined with the help of the laboratory installation AFISPRO 2 on USTER HVI 1000 M 1000 devices of the company «USTER» Switzerland. A C-70 scavenger machine was used to produce the scab tape. The chassis ribbon was produced under the modified speed modes of the receiver and main drums and the rod between the main drum and the hats.

USTER TESTER 5-S800 was tested. The results of the experiments are shown in table 1.

Table 1

	Wiring between the caps and the main drum	Capacity of carding machine (kg/h)	The frequency of rotation of the main drum	Speed of the receiver	Linear density of carding tape (ctex)	Roughness of a carding tape According to the Uster system
C <sub>1</sub> =0,4 C <sub>2</sub> =0,35 C <sub>3</sub> =0,25 C <sub>4</sub> =0,22 C <sub>5</sub> =0,2	50	700 800 860	1150	5,0	4,9	
C <sub>1</sub> =0,25 C <sub>2</sub> =0,25 C <sub>3</sub> =0,22 C <sub>4</sub> =0,2 C <sub>5</sub> =0,175	50	700 800 860	1500	4,9	4,9	
			1800	5,0	5,0	

### The effect of wiring between the main drum and the caps on the unevenness of the carding tape

- In the formation between the main body and the slap C1=0,4; C2=0,35; C3=0,25; C4=0,22; C5=0,2
- In the formation between the main body and the slap C1=0,25; C2=0,25; C3=0,22; C4=0,2; C5=0,175

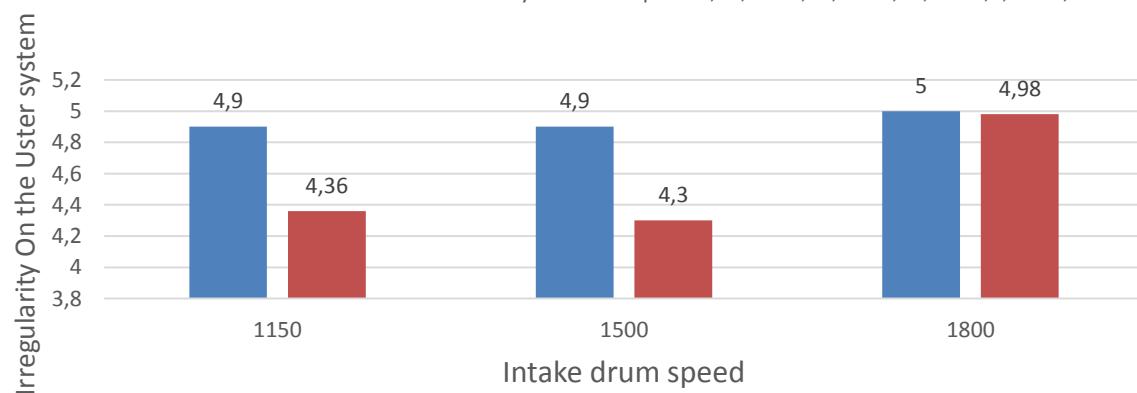


Fig. 1 Effect of wiring between the main drum and the caps on the unevenness of the carding tape

As can be seen from table-1 and the histogram (figure 1) between the main drum and the hats is 0.25; 0.25; 0.22; 0.2; 0.175 and the speed of rotation of the main drum is 800 min<sup>-1</sup>, the receiving drum is 1,500 min<sup>-1</sup> less than the roughness of the chalk tape compared to the other variants. Further experiments were conducted on these scavenging machines.

Results summarized in table 2

Table 2

The thread between the hats and the main drum	Productivity carding machine productivity carding machine productivity carding machine (kg/yac)	The frequency of rotation of the main drum	Intake drum speed	Linear density carding tape	Uster system unevenness	Linear density tape with tape	Ribbon Roughness According to the Uster system (U %)	The linear density of the roving (tex)	Roughness of the roving (U%)
C <sub>1</sub> =0,25 C <sub>2</sub> =0,25 C <sub>3</sub> =0,22 C <sub>4</sub> =0,2 C <sub>5</sub> =0,17 5	50	700	1150	5,0	4,36	5,0	2,62	500	4,36
		800	1500	4,9	4,3	4,99	2,56	500	4,2
		860	1800	5,0	4,98	5,0	2,82	500	4,46
C <sub>1</sub> =0,25 C <sub>2</sub> =0,25 C <sub>3</sub> =0,22 C <sub>4</sub> =0,2 C <sub>5</sub> =0,17 5	70	700	1150	6,0	4,32	6,0	2,6	600	4,3
		800	1500	5,9	4,2	5,9	2,5	600	4,15
		860	1800	6,0	4,9	6,01	2,8	600	4,4
C <sub>1</sub> =0,25 C <sub>2</sub> =0,25 C <sub>3</sub> =0,22 C <sub>4</sub> =0,2 C <sub>5</sub> =0,17 5	90	700	1150	7,0	4,3	7,0	2,6	739	4,3
		800	1500	7,1	4,1	7,0	2,4	740	4,0
		860	1800	7,0	4,8	7,0	2,65	739	4,34

As can be seen from the table 2 at machine capacity 90 kg/h and main drum speed 800 min<sup>-1</sup>. 1,500 min<sup>-1</sup> per cent of the intake drum's roughness as determined by the 4.1 per cent Uster net tape system, 2.4 per cent tape from the tape machine, and 4.0 per cent equals slightly better than other variants.

The following conclusions can be drawn from the results: the increase in the performance and speed of the main drum, as well as the linear density of the chassis tape within the limits studied, does not cause a deterioration in the quality of the tape and the rovnik. Linear density buckles T=20 tex were produced to determine the influence of the quality of the semi-finished products obtained by the above parameters. Nm=50/1, Ne=30/1.

The ribbon roughness, the rows and the buckle were determined on the USTER TESTER 5-S800 instrument, the breaking load, the breaking elongation and breaking time on the TENSORAPID 4 instrument, the buckle torque on the USTER ZWEIGLE TWIST TESTER 5, The quality of the yarn by the USTER ZWEIGLE YARM INSPECTION WINDER was determined by the organoleptic method

The test results are compared to the USTER Statistics-2013 standard values and are shown in Table 3.

Nº	Indicators	Uster Statistics 2018 year	Experimental yarn
1	Linear density tex	19,6	20

2	Roughness in linear density, U%	10,52	10,6
3	Coefficient of variation in linear density, CV%	13,15	13,32
4	Breaking load (Forse), cN	370	330
5	The coefficient of variation in breaking load, CV%	7,1	6,9
6	Relative breaking load, (Rkm) cN / tex	18,9	16,5
	Coefficient of variation in relative breaking load, CV%	6,3	6,9
	Elongation at Break (Elongation)%	6,5	5,01
	Number of thin spots (Thin -50% / km)	3	5
	The number of thick places (Thick + 50% / km)	49	120
	Number of knots (Neps200 / km)	115	180

As can be seen from the table, the resulting linear density yarn 20 tex ( $N_e = 30$ ) for physico-mechanical properties such as: linear density irregularity and linear density variation coefficient increased by 6%, fracture load variation coefficient, and the coefficient of variation on the relative breaking load increased by 13%, although these figures and their increase correspond to 5% of the category of quality indicators Uster Statistik-2018, and these quality indicators are the breaking load, the number of knots (Neps) and the relative breaking load has also increased to 25% of the quality category

### 3. CONCLUSION

The findings are as follows:

1. If the shearing between the main drum and the caps is reduced to within  $C_1=0,25$ ;  $C_2=0,25$ ;  $C_3=0,22$ ;  $C_4=0,2$ ;  $C_5=0,175$ , and the velocity of the cap is increased, the quality of the cloth is increased.
2. Increasing the performance of the scratch tape to 90 kg/h, at the speed of rotation of the main drum 800 min<sup>-1</sup>, the receiver drum 1500 min<sup>-1</sup>does not impair the quality of the scratch tape.
3. The quality of the semi-finished and yarn produced from the tape with the changed parameters of the fuelling of the scratch machine with a capacity of 90 kg/h meets the USTER Statistics-2018 standard values and corresponds to 25% of the quality category.

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